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EVALUATION

Date: 12/11/63

DATE: 19 ^{NOVEMBER} ~~October~~ 1963

PLACE: [redacted]

SUBJ: Monitor Development of the Versatile, High Precision Stereo Viewer

ENCL: [redacted] MJM/de-11/19/63

ATTENDERS: [redacted]

DISCUSSION:

1. At the outset, [redacted] requested certain additions to each of the company progress reports. All were acceded to by [redacted] They are as follows:

a. Change to monthly progress reports instead of the present bi-monthly frequency.

b. A "milestone" method of indicating progress in relation to the overall job. [redacted] says they "are running behind at the moment.)"

c. A monthly financial statement indicating amount and percentage of actual and obligated expenditures.

d. Documentation of all conference agreements.

2. Relative to the last item above, several subjects, which had been discussed during the previous visit to the plant, were cited as not being documented in the first Contractor Progress Report. These questions with clarifications are as follows:

a. The design objective temperature maximum of 100° above ambient at the film plane was revised to 30° above ambient. [redacted] agreed to this, but with some hesitancy. This writer has some doubt about their achieving this since the NAVPIC viewer (Model 387) produced a maximum temperature of 119° (from an approx. ambient of 72°) and has a less complicated condenser.

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b. A design or description demonstrating the comparator potential of this instrument with modifications was requested. In response [] submits the enclosed report, 552 Product Improvement. Briefly, [] proposes to change the screw drives and provide magnetic type encoders, X-Y axis counters, nixie tube displays, On-Off and zero reset switches. This system would have a digit bit size of $2\frac{1}{2}$ microns and a specified accuracy of 5 microns plus .01% of distance travelled. This discussion was of interest because Navy's model of the viewer will have a measuring capability. [] stated that a system utilizing the present screw drives would permit a bit size of 10 microns, which satisfies NAVPIC's requirements.

c. A binocular monoscopic viewing capability in either eye channel was requested. A design utilizing a movable beam-splitter was exhibited to provide such flexibility.

d. Documentation was requested concerning the correlation between scan drive speed of each objective assembly with magnification change and dissimilar settings. Such documentation will be provided in the next progress report.

e. A statement in the last progress report describing an excess film loop of 16 feet was questioned. Examination of the engineering drawings indicate that this loop from center-of-format to center-of-format (split light table) will be 19 feet.

f. Documentation was requested that the high intensity illumination would have a minimum color temperature of 3500°K with no "yellowing" of the light down to 50% intensity. Finally, this light source must correlate with each objective lens (4) by corresponding interchange of condenser lenses. The next contractors report will certify these points.

3. [] demonstrated a breadboard of the planned vacuum system for film hold-down. It consists of two thin metal strips with slight channels on their under-surfaces, rubber-lined flanges extending over the film edge, and plastic tubing through which the air is exhausted at one end of each strip by means of a single compression pump. The front strip is fixed and the rear strip can be moved back and forth over the Microgroove material of the light box to accommodate various width films. During film transport the pump action is reversed and air is blown under the film causing an arcing or "rounding" of the film, so slightly, however, that the two film edges remain beneath the strips. This later characteristic is intended to insure rapid actuation of the vacuum whether the film is loaded emulsion up or down. Two major objections were expressed as follows (with related discussion):

a. With the rubber surface constantly in contact with the film, damage to the base or emulsion might result. It was agreed that the strips must remain in contact with the film for rapid vacuum actuation without supplementary use of the hands. Therefore, [] will try to use a smoother lining material.

b. The metal strips prohibit reading of titling along the film edges during scanning operations or simply for exposure identification. No procedure involving retraction of these strips is feasible because of the rapid actuation requirement mentioned above and a 5 mm. clearance between the high power objective and the

light table surfaces. (These objectives can pass over the metal strips.) Since the titling must be visible, [] will try to fabricate the vacuum strips from plexiglass. In response to a request they will attempt to provide a vacuum reserve mechanism so that the compressor could be turned off for vibration-free critical viewing without loss of vacuum.

4. [] states that the adjustable "dot" reticle (1'-4' of arc) will not be round. They have been able to find only one type of iris shutter which closes tight enough. This has six leaves and produces a serrated edge. Mr. [] is insisting that the eccentricity be no more than 5% of the dot radius.

5. The size and location of the objective lenses will result in a minimum 1 3/16" center-to-center distance instead of the 1" design objective. This is the same as on the Model 387 at NAVPIC and is acceptable; however, it is a firm requirement.

6. An elapsed-time meter will be included to facilitate maintenance schedules.

7. Consideration will be given to providing exterior handles attached directly to the frame to facilitate safe movement of the instrument.

8. The frame alone will weigh 1600 lbs. and the total weight of the instrument will be 2500 lbs., approximately.

9. NAVPIC's experience with the [] Rapid Screening Viewer was cited in recommending sufficient retraction of the leveling jack legs to avoid their damage during movement of the viewer on and off the elevator and over uneven surfaces. They will give us the maximum possible: 1" - 1 1/4" above the floor when rolling on the casters. This may be adequate; however, a question exists as to the adequacy of the integral vibration isolators selected. If a more massive type were necessary, the 1 1/4" would be severely reduced or separate isolators, with attendant leveling problems, might be required.

10. It was stated by [] that the requirement to handle 35^{mm.} film has been cancelled.

11. The eroding of the relay contacts on NAVPIC's Model 387 viewer was cited as a problem to be insured against in the new development. Incidentally, as of 19 Nov. 63 their estimate for repair and general overhaul of our viewer had not reached [] President. Hopefully we can be expecting it soon.

12. Engineering drawings of the exterior and interior of the eyepiece assembly were examined and discussed. In addition to the usual interpupillary adjustment, controls will be provided for varying the two eyelens optical axes from parallel to a slight "toe-in." Several control knobs will be on the face of the assembly. It is expected that the heat problem with the existing rotation discs will be avoided in the redesign of the adjustment control. It was requested of [] that they consider methods of shielding ambient light around the eye-lenses - somewhat like the [] approach.

13. Considerable discussion revolved around the control panel/work shelf. [] suggested that we may prefer a single detachable unit which could be rotated 180° (end-for-end) to provide the right-and left-handed control panel positioning required. This would necessitate switching the film drive handles also. For this

and other reasons it was decided to retain the separate caster-mounted control panel console which could be "nested" in the permanent work shelf in right or left positions. This console will contain the electronic circuitry and components serving the joystick mechanism and other controls. In addition, a separate caster-mounted, sound-proofed cabinet will contain the vacuum system compressor and possibly other noise-and vibration-producing equipment.

STAT 14. In discussion, [] proposed use of a "sleeve" fine tuning control on the joystick to supplement the "fairly accurate" logic which will be built in for maintaining stereo during scanning operations on materials with differential swing (or yaw) and differential scale (requiring different magnification in each optical path). It was decided that the operator's eye accommodation and the existing thumb type of scan channel selection were sufficient and the "sleeve" control not necessary. Conversation with the Model 387 operators at NAVPIC since, indicates that there is some considerable eye strain with the existing equipment during a scan operation. However, it must be remembered that Model 387 does not have the differential logic which will be included on the 532A. A change which ~~was~~ requested is the design of a "saddle" thumb switch for LEFT, BOTH or RIGHT channel selection.

CONCLUSIONS:

STAT 1. Work performed in the five weeks since the last plant visit indicates some concrete progress on the part of [] and some distinct problem areas concerning the vacuum system, the dot reticle, and types of relays to be used. Some "gray" areas to be watched include documentation of conference agreements, temperature build-up at the film plane, minimum center-to-center distance between stereo objectives, and selection and location of the vibration isolators.

STAT 2. Despite indicated questions considerable confidence is held concerning [] [] ability to resolve all significant problems of design and fabrication.

Very respectfully,

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